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COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING

DIVISION OF AIR QUALITY CONTROL

1980

AIR QUALITY DATA REPORT

ONE WINTER STREET - 8TH FLOOR
BOSTON, MASSACHUSETTS 02108

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I. INTRODUCTION

This report presents 1980 annual air quality data for Massachusetts collected by the Division of Air Quality Control within the Department of Environmental Quality Engineering. This data is collected by the Commonwealth and submitted to U.S. Environmental Protection Agency (EPA) in accordance with Regulations 40 CFR 58.

The Division of Air Quality Control (DAQC) has primary responsiblity for measuring ambient air quality to verify compliance with state and national standards for ambient air quality (see Table 1), to support development of regulations designed to reduce ambient air contaminants, to assess the effectiveness of existing air pollution control strategies and to fulfill EPA reporting requirements for air quality data.

The continuous air monitoring stations are located in a variety of areas within Massachusetts, both urban and rural. The stations are equipped with air pollution monitoring equipment (see Table 4, equipment listing) and, in some cases, meteorological equipment. The air pollution monitors record levels of ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide and total suspended particulates. Meteorological parameters measured in most instances include wind speed, wind direction and temperature.

The Commonwealth's ambient air monitoring network is complemented by a private network of monitors. The private network - a result of Massachusetts allowing certain facilities to burn a higher sulfur content fuel than is otherwise allowed by Massachusetts air quality regulations - is limited to sulfur dioxide and particulate monitoring. Figures 2, 4, 7, 8, and 9 present the Commonwealth's monitoring network for each of the five pollutants, maintained by DAQC in 1980.

This year the Division collected a total of 300,642 hourly samples at the state operated sites and 503,315 hourly samples at the privately operated sites for a grand total of 803,957 (see Figure 1).

The figure represents a reduction of 33,660 hourly samples over those collected in 1979. This data has been summarized herein as a matter of public record for information purposes. Data that had standard violations were recorded for the following pollutants; 8 hour carbon monoxide and ozone (see Table 2). For further information relative to the content of this report or other air quality related matters please contact either the Division of Air Quality Control in Boston or the regional office responsible for the particular area of concern.

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FIGURE 1

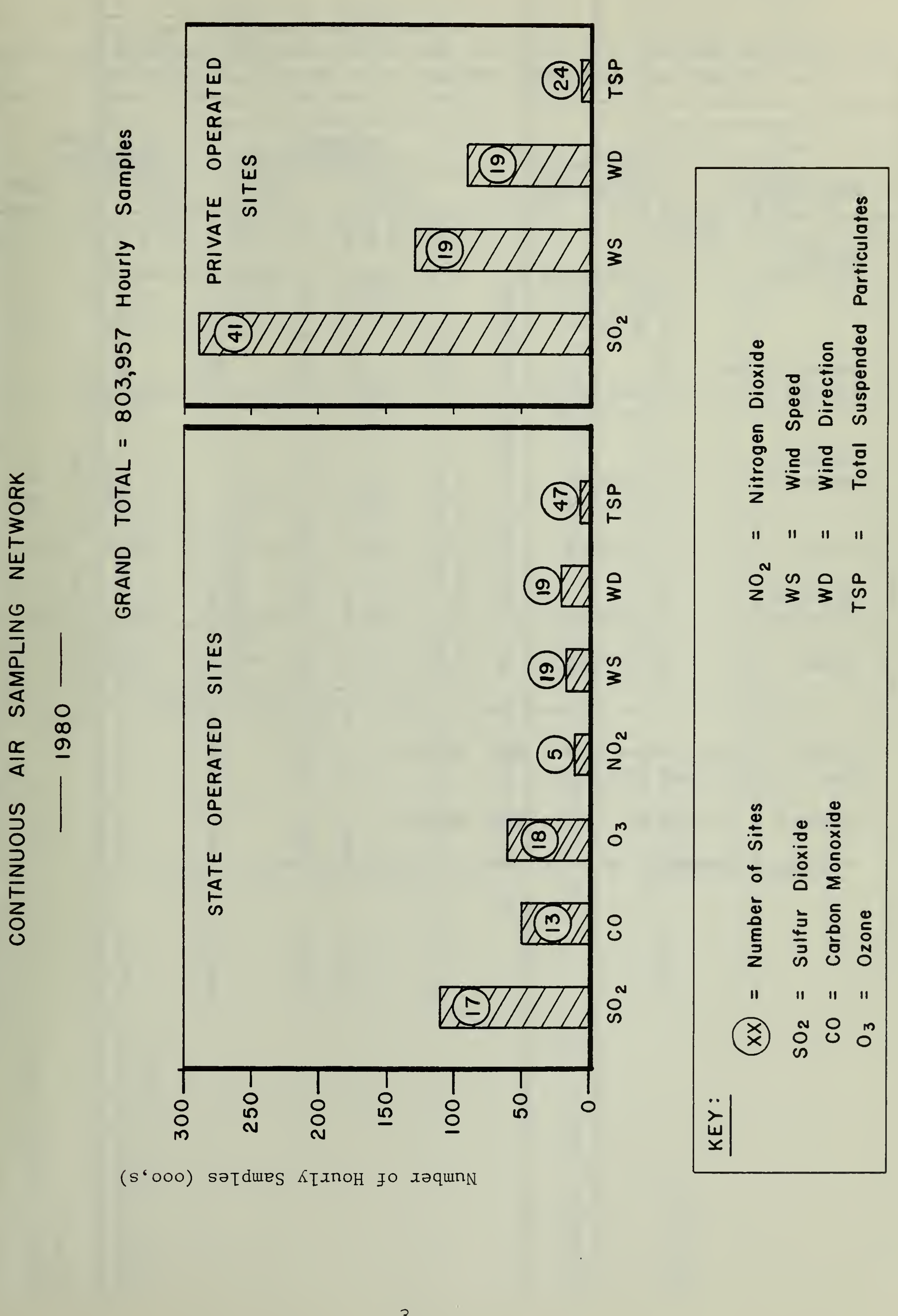

CONTINUOUS AIR SAMPLING NETWORK
— 1980 —
GRAND TOTAL = 803,957 Hourly Samples
Number of Hourly Samples (000's)
300
250
200
150
100
50
0
STATE OPERATED SITES
17
13
18
5
19
19
47
SO2
CO
O3
NO2
WS
WD
TSP
PRIVATE OPERATED SITES
41
19
19
24
SO2
WS
WD
TSP
KEY:
XX = Number of Sites
SO2 = Sulfur Dioxide
CO = Carbon Monoxide
O3 = Ozone
NO2 = Nitrogen Dioxide
WS = Wind Speed
WD = Wind Direction
TSP = Total Suspended Particulates

TABLE 1

STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS					
		PRIMARY STANDARD		SECONDARY STANDARD	
POLLUTANT	AVERAGING INTERVAL	ug/m^3	ppm	ug/m^3	ppm
Sulfur Dioxide	Annually	80	0.03	-	-
	24 hour	365	0.14	-	-
	3 hour	-	-	1,300	0.5
Particulate Matter	Annually	75	-	60**	-
	24 hour	260	-	150	-
Carbon Monoxide	8 hour	10*	9	10*	9
	1 hour	40*	35	40*	35
Ozone	1 hour	240	0.12	240	0.12
Nitrogen Dioxide	Annually	100	0.05	100	0.05
Lead	3 month	1.5	-	1.5	-

ug/m^3 - micrograms per cubic meter
ppm - parts per million

*mg/m^3 - milligram per cubic meter

**annual average is considered as guidelines

STATIONS VIOLATING NATIONAL AMBIENT AIR QUALITY PRIMARY STANDARDS

POLLUTANT	LOCATION	AQCR	ADDRESS	SAROAD #	MONTH	DAY	TIME	LEVEL REACHED
SULFUR DIOXIDE (SO_2) (Annual)								
			NO VIOLATIONS RECORDED					
CARBON MONOXIDE (CO) (Eight hour average)	Boston	Met. Boston	590 Commonwealth Ave (Kenmore Square)	0240-002	Feb.	21	12 AM	10.1 mg/M^3
					Mar.	8	2 AM	11.8 mg/M^3
					Nov.	21	9 PM	11.2 mg/M^3
	Boston	Met. Boston	Visconti St. (Callahan Tunnel)	0240-016	Jan.	6	11 PM	10.8 mg/M^3
					Feb.	27	9 PM	11.9 mg/M^3
					Mar.	20	1 PM	11.6 mg/M^3
	Boston	Met. Boston	600 Washington St.	0240-022	Dec.	23	10 PM	13.9 mg/M^3
	Medford	Met. Boston	Fellsway & Rte. 16	1220-003	Feb.	20	11 PM	12.2 mg/M^3
					Mar.	8	1 PM	11.1 mg/M^3
					Apr.	27	3 PM	12.2 mg/M^3
	Worcester	Central MA	Corner New Salem & Washingtons Sts.	2640-012	Dec.	29	12 AM	12.4 mg/M^3
			NO VIOLATIONS OF THE ONE HOUR STANDARD RECORDED					
NITROGEN DIOXIDE (NO_2)			NO VIOLATIONS RECORDED - INSUFFICIENT DATA					
OZONE (O_3) (Hourly)	Agawam	Pioneer Valley	Tenn. Gas Pipeline	0030-002	June	25	6 PM	.185 ppm
					July	5	2 PM	.153 ppm
					Aug.	5	1 PM	.155 ppm
	Attleboro	Southeastern	947 Park Street	0120-003	June	24	6 PM	.136 ppm
					July	21	7 PM	.127 ppm
					Aug.	5	3 PM	.121 ppm

OZONE (O_3)	Boston	Met. Boston	340 Breman St.	0240-021	July	15	3 PM	.120 ppm
	Danvers	Met. Boston	Rte. 62, Elliot St.	0480-002	June	25	9 PM	.138 ppm
					July	15	4 PM	.135 ppm
					July	22	6 PM	.135 ppm
	Easton	Met. Boston	Post Office, 300 Main St.	0535-001	July	17	3 PM	.133 ppm
					July	17	4 PM	.145 ppm
					July	17	5 PM	.140 ppm
	Georgetown	Merrimack Valley	High School	0730-001	July	15	4 PM	.160 ppm
					July	15	5 PM	.151 ppm
					July	27	10 AM	.144 ppm
	Hamilton	Met. Boston	Bld. 9, Sagamore Hill	0795-001	July	17	3 PM	.120 ppm
					Aug.	1	12 AM	.134 ppm
	Medfield	Met. Boston	No. Meadow St.	1210-001	June	21	11 PM	.154 ppm
					Aug.	2	2 PM	.159 ppm
					Aug.	5	11 AM	.148 ppmm
	Pittsfield	Berkshire	East St.	1800-005	Sept.	20	2 PM	.130 ppm
	Quincy	Met. Boston	Fore River Bridge	1880-002	July	27	1 PM	.129 ppm
					Aug.	1	11 AM	.121 ppm
	Somerville	Met. Boston	Tufts University	2100-003	June	25	7 PM	.132 ppm
					July	15	3 PM	.140 ppm
					July	15	2 PM	.130 ppm
	Sudbury	Met. Boston	Water Row Rd.	2196-001	June	25	7 PM	.140 ppm
					June	25	8 PM	.140 ppm
					July	15	3 PM	.150 ppm
	Tewksbury	Merrimack Valley	Civil Def. Hdqtrs.	2252-001	June	25	8 PM	.140 ppm
					July	15	4 PM	.165 ppm
	Watertown	Met. Boston	Victory Field	2380-005	June	1	10 AM	.134 ppm
					June	1	3 PM	.134 ppm
					July	15	3 PM	.145 ppm

OZONE (O_3)	Worcester	Cent. Mass.	Corner New Salem & Washington St.	2640-012	June	25	6 PM	.138 ppm
					July	5	7 PM	.126 ppm
					July	5	6 PM	.124 ppm
	Worcester	Cent. Mass.	Worcester Airport	2640-015	June	25	7 PM	.177 ppm
					July	15	3 PM	.193 ppm
					July	15	4 PM	.178 ppm

TABLE 3

HEALTH AND WELFARE EFFECTS OF AIR POLLUTANTS

POLLUTANTS AND THEIR SOURCES	HEALTH EFFECTS	WELFARE EFFECTS
Ozone Product of reactions of motor vehicle exhaust, industrial process emissions and other fossil fuel combustion emissions, in the presense of sunlight.	Causes difficulty in breathing, especially when exercising, irritates eyes, may result in an increased susceptibility to respiratory infection.	Toxic to plants by causing both leaf damage and a decrease in growth. Can weaken materials such as rubber and fabrics.
Total Suspended Particulates Fossil fuel burning, industrial process emissions, motor vehicle exhaust, traffic movement over dusty roads.	Causes further distress to those with chronic lung diseases, can alter the lungs natural cleansing mechanism and can either be composed of or have toxic materials adhered to the surface.	Causes soiling of materials, are corrosive and can damage buildings. In addition, causes haze which reduces visibility and the amount of solar energy reaching the earth.
Carbon Monoxide Internal combustion engines, fossil fuel combustion and cigarette smoking.	Reduces the blood's ability to carry oxygen which may cause heart and brain damage. Causes a decreased exercise capacity in those with angina pectoris. Also can cause slowed physical reactions, dizziness, fatigue and headache.	No known effect on materials or vegetation.
Sulfur Dioxide Combustion of fossil fuel	Irritation of throat and lungs and aggravation of symptoms among those with chronic lung diseases.	Corrosion and deterioration of metals, brittleness of paper, discoloration of paint and deterioration of fabric. Causes leaf damage to some plants.
Nitrogen Dioxide Emitted from motor vehicles and fossil fuel burning operations such as power plants as well as from chemical plants and refineries.	Aggravation of symptoms in those with asthma and chronic bronchitis an increased susceptibility to respiratory infections and a decrease in lung function.	Fading of dyes, yellowing of leaves on plants, and changing the horizon to a reddish brown color.

TABLE 4

ANALYSIS COLLECTION METHOD LISTING

Sulfur Dioxide:
*14 instrumental coulometric
20 pulse flourescent instrumental

Carbon Monoxide:
11 non-dispersive infra-red instrumental

Ozone:
11 chemiluminescent instrumental

Nitrogen Dioxide:
14 chemiluminescence instrumental

Total Suspended Particulates
High volume air sampler

* corresponds to data summary: instrument method

II. 1980 SITE DIRECTORY

CITY SITE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC HGT	STATION TYPE	POLLUTANTS SAMPLED SO$_2$	CO	O$_3$	NO$_2$	TSP
BERKSHIRE AIR QUALITY CONTROL REGION									
Pittsfield East St. (Pittsfield Incinerator)	1800-005	647923 4701385	15	Rural-Industrial	X		X		
Pittsfield Newall St. (Hibber School)	1800-002	646000 4701000	40	Suburban-Residential					X
Pittsfield Berkshire Commons (roof of Berkshire Commons)	1800-006	643500 4699897	33	Center City Commercial					X
CENTRAL MASSACHUSETTS AIR QUALITY CONTROL REGION									
Athol Main St. (Athol City Hall)	0100-001	727400 4719200	60	Center City-Commercial					X
Charlton Bay Path Technical High	0372-001	255600 4668600	30	Rural-Agricultural			X		
Fitchburg Summer St. Substation (Fitchburg Gas & Electric Co.)	0620-003	271500 4716800	15	Center City-Industrial	X				
Fitchburg Water St. (Fire Station)	0620-004	270900 4717200	25	Center City-Industrial					X
Fitchburg 655 Main St. (Fitchburg Gas & Electric Co.)	0620-006	269900 4718200	33	Center City-Commercial					X
Gardner Gardner Airport (BTWN Hangars 1&2)	0720-003	- -	15	remote					X

II. 1980 SITE DIRECTORY

TY TE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC. HGT.	STATION TYPE	POLLUTANTS SAMPLED				
					SO_2	CO	O_3	NO_2	TSP
rren River St. (Quaboag Reg. High School)	2372-001	732000 4677900	16	Rural-Agricultural					X
rcester 810 Main St. (Narcus Dept. Store)	2640-004	268851 4682600	60	Center City-Industrial					X
rcester 950 Main St. (Clark Univ.)	2640-008	267000 4681200	60	Center City-University					X
rcester 75 Grove St. (Parker Bldg.)	2640-009	- -	50	Center City-Commercial					X
rcester Boylston St. (Quinnsigamond Community College)	2640-011	269600 4688100	60	Center City-Commercial					X
rcester Corner New Salem & Washington Sts. (near downtown Worcester)	2640-012	269000 4682100	13	Center City-Commercial	X	X	X	X	X
rcester 419 Belmont St. (Worcester health dept., corner of Belmont St and Lake Ave.)	2640-013	272400 4683700	15	Center City Residential					X
orcester Worcester Airport	2640-015	262700 4684000	15	Suburban-Residentail			X		
orcester 2 Washington St. (Worcester YMCA Bldg.)	2640-016	269100 4682200	26	Center City-Commercial					X
orcester Central and Summer Sts. (Main Post Office)	2640-017	269100 4683750	30	Center City-Commercial	X				

II. 1980 SITE DIRECTORY

CITY SITE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC HGT	STATION TYPE	POLLUTANTS SAMPLED SO_2	CO	O_3	NO_2	TSP
MERRIMACK VALLEY AIR QUALITY CONTROL REGION									
Georgetown Georgetown High School Parking Lot	0730-001	337300 4731900	12	Suburban-Residential	X		X		
Haverhill North & Essex Sts.	0840-001	330000 4738100	75	Center City-Commercial					X
Lawrence 1 General St. (Lawrence General Hospital)	1000-003	324000 4730500	70	Center City-Commercial	X				X
Lawrence Lawrence Airport	1000-004	-- --	15	Rural	X				
Lowell Kirk St. (Lowell High School)	1080-001	310500 4723800	60	Center City-Commercial					X
Lowell John St. Municipal Garage	1080-004	310600 4723900	25	Center City-Commercial	X	X			
Lowell Hospital Drive	1080-005	310600 4723900	25	Center City-Commercial					X
Tewksbury Civil Defense Bldg. (Tewksbury State Hospital)	2252-001	317850 4719475	12	Suburban-Residential		X	X	X	
METROPOLITAN BOSTON AIR QUALITY CONTROL REGION									
Boston 590 Commonwealth Ave. (Kenmore Sq Site)	0240-002	327100 4690400	10	Center City-Commercial	X	X		X	
Boston Southampton St. (Fire Hdqts.)	0240-012	329580 4688230	40	Center City-Commercial					X

II. 1980 SITE DIRECTORY

TY TE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC HGT	STATION TYPE	POLLUTANTS SAMPLED				
					SO_2	CO	O_3	NO_2	TSP
ston Kneeland St. (State Parking Lot)	0240-015	330000 4690000	15	Center City-Commercial	X				
ston Visconti St., E. Boston (Callahan Tunnel)	0240-016	332000 4692500	15	Center City-Residential	X	X	X	X	
ston 340 Breman St., E. Boston (substation)	0240-021	333000 4693550	14	Center City-Residential	X	X	X	X	
ston 600 Washington St	0240-022	330100 4690750	13	Center City-Commercial		X			
ston 200 Columbus Ave (fire station rooftop)	0240-024	329400 4690350	40	Center City-Commercial					X
ston 59 the Fenway (fire alarm headquarters)	0240-025	327690 4689880	3	Center City-Commercial					X
ookline 115 Greenough St. (Brookline HS)	0340-001	324500 4689000	70	Center City-Residential					X
ockton Crescent St., Rte. 27 (Paine School)	0320-003	333300 4660400	30	Center City-Industrial					X
ambridge Oxford St. (Harvard Herbaria)	0360-001	325042 4693380	60	Center City-Commercial					X
helsea Chestnut and Sixth St.	0380-002	332500 4695100	42	Center City-Commercial					X
anvers Rte 62, Elliot St	0480-002	337800 4717200	40	Rural-Agricultural			X		

II. 1980 SITE DIRECTORY

CITY SITE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC HGT	STATION TYPE	POLLUTANTS SAMPLED				
					SO_2	CO	O_3	NO_2	TSP
Easton Post Office, 300 Main Street North Easton	0535-001	327050 4659170	14	Rural-Near Urban			X		
Framingham 600 Concord St. (Middlesex Cty. Court)	0660-001	301300 4685000	50	Suburban-Residential					X
Hamilton Bldg. 9, Sagamore Hill (Air Force Sta.)	0795-001	351150 4721200	18	Rural-Near Urban			X		
Medfield North Meadow St. (Rt. 27, Medfield State Hospital)	1210-001	307200 4675800	75	Rural-Commercial	X		X		X
Medford 100-200 Main St. (Fire Headqtrs.)	1220-002	326300 4697990	20	Center City-Commercial					X
Medford The Fellsway & Rte. 16 (Wellington Circle Site)	1220-003	328600 4696600	15	Suburban-Industrial	X	X	X		
Needham 148 Chestnut St. (Glover Memorial Hospital)	1480-003	315500 4682750	35	Suburban-Commercial					X
Norwood Nahattan Street (Fire Station)	1700-001	318700 4673300	30	Suburban-Commercial					X
Quincy Fore River Bridge	1880-002	337300 4678600	15	Suburban-Industrial	X	X	X		
Quincy Hancock Street (Atlantic Fire Station)	1880-007	332400 4682100	30	Suburban-Residential					X

II. 1980 SITE DIRECTORY

TY TE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC HGT	STATION TYPE	POLLUTANTS SAMPLED				
					SO_2	CO	O_3	NO_2	TSP
vere 368 Garfield St. (J.A. Garfield Jr. High School)	1940-002	336000 4696154	40	Suburban-Residential					X
merville Powder House Blvd Tufts University	2100-003	326500 4696550	14	Suburban-Residential	X	X	X	X	
dbury Water Row Road (Great Meadows Nat'l Wildlife Reserve)	2196-001	303350 4695100	14	Rural-Agricultural			X		
tertown Victory Field	2380-005	320310 4693500	13	Center City-Residential	X	X	X	X	
burn Woburn St. & Montvale Ave. (Middlesex Cty. Court)	2620-002	323000 4705000	40	Suburban-Commercial					X
	PIONEER VALLEY AIR QUALITY CONTROL REGION								
awam Tenn. Gas Pipeline Dist.	0030-002	695700 4656250	18	Rural-Near Urban			X		
icopee Market Square (City Hall)	0400-001	697000 4669000	40	Center City-Commercial					X
icopee 939 Chicopee St.	0400-005	697900 4673400	15	Center City-Industrial	X				
eenfield Deerfield St. (Wastewater Control Facility)	0780-002	697200 4717000	20	Rural-Industrial			X		
lyoke 68 Cabot Street	0860-006	697600 4674500	84	Center City-Residential					X
lyoke 1 Court Square (Top of District Court House)	0860-007	697480 4674500	40	Center City-Commercial					X

II. 1980 SITE DIRECTORY

CITY SITE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC HGT	STATION TYPE	POLLUTANTS SAMPLED				
					SO_2	CO	O_3	NO_2	TSP
Northfield Easthall Bookstore Path (Northfield School)	1652-001	709000 4731000	46	Rural-Unqualified					X
Springfield E. Columbus Ave.	2160-005	699000 4662000	15	Center City-Industrial	X	X			
Springfield Fernbank St. near Boston Rd.	2160-014	707080 4668200	12	Suburban-Commercial	X	X			
Springfield 25 Mill St. (Fire Station)	2160-002	698825 4664475	35	Center City-Commercial					X
Springfield 142 Taylor St. (Fire Station)	2160-003	700000 4664000	49	Center City-Industrial					X
Springfield 59 Howard St. (Howard St. School)	2160-011	699460 4663380	59	Center City-Commercial					X
West Springfield Van Deene St. (Fire Dept. Headqtrs.)	2475-003	696400 4663940	22	Suburban-Commercial					X

SOUTHEASTERN MASSACHUSETTS AIR QUALITY CONTROL REGION

CITY SITE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC HGT	STATION TYPE	SO_2	CO	O_3	NO_2	TSP
Attleboro So. Main St. (Fire Station)	0120-002	311000 4644000	40	Center City-Residential	X				X
Attleboro 947 Park St. (LaSalette Shrine)	0120-003	312200 4644300	15	Suburban-Commercial	X		X		

II. 1980 SITE DIRECTORY

TY TE LOCATION	SAROAD # DIST. #	UTM COORD. EAST NORTH	REC HGT	STATION TYPE	POLLUTANTS SAMPLED				
					SO_2	CO	O_3	NO_2	TSP
ll River 165 Bedford St. (Central Fire Station)	0580-001	--- ---	50	Center City-Commercial					X
ll River 289 Rock Street (Durphy HS)	0580-003	321000 4619000	60	Center City-Commercial					X
ll River Globe Street	0580-004	319700 4616900	15	Center City-Commercial	X				
w Bedford 455 County Street (High School)	1500-002	339000 4611000	60						X
unton 88 Washington St. (Morton Hospital)	2240-001	326400 4641200	60	Center City-Commercial					X

III. SAMPLING RESULTS FOR CONTINUOUS DATA

A. Sulfur Dioxide

Sample Collection and Analysis

DAQC uses two instrumental methods for analysis of continuous sulfur dioxide concentrations. The manufacturers of this equipment are: Philips Electronic Inc., (Phillips PW 9700), and Thermo Electron Inc. (Teco Model 43). The Phillips instrument employs coulometric titration and the Thermo instrument employs pulse flourescent as their measurement principles. Both analytical methodologies meet equivalency requirements published by the U.S. Environmental Protection Agency in Part 53, 40 CFR May 10, 1979.

Summary of Data

DAQC operated 21 stations for SO_2 in 1980 and collected 111,834 hourly samples. As presented in Table 5 all continuous SO_2 monitors in the state are presently meeting the National Ambient Air Quality Standard for sulfur dioxide. The continued restrictions upon fuel sulfur content are responsible for successful statewide compliance with the SO_2 standard. At 9 of the sites there was an increase in the 1980 SO_2 annual arithmetic mean over the 1979 arithmetic mean; 7 sites recorded annual arithmetic means in 1980 less than those recorded for 1979, one site remained the same; and 4 new sites were added to the network.

Continuous Monitoring Network
Sulfur Dioxide

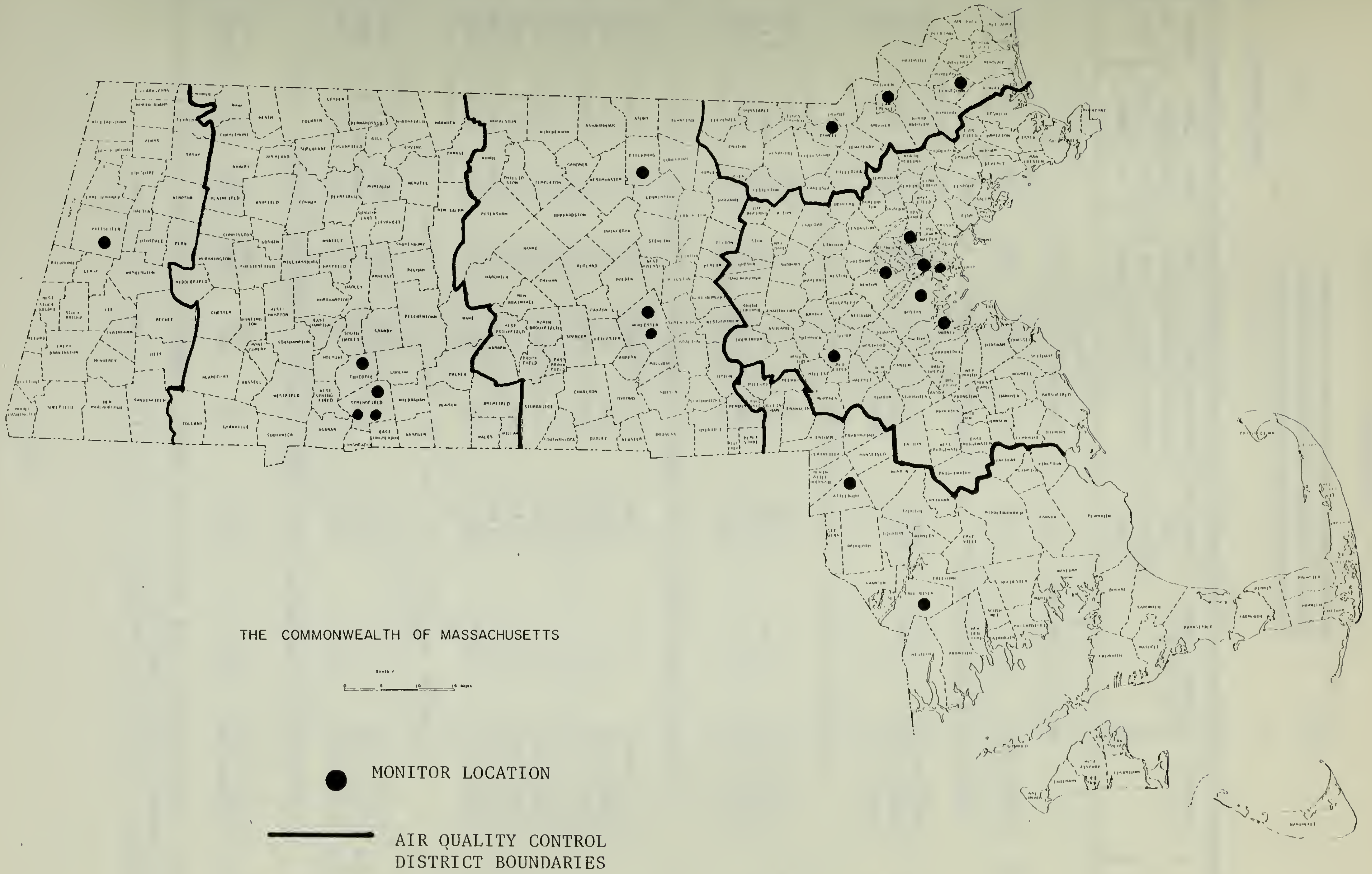

THE COMMONWEALTH OF MASSACHUSETTS
MONITOR LOCATION
AIR QUALITY CONTROL DISTRICT BOUNDARIES

TABLE 5

1980 SULFUR DIOXIDE SUMMARY

SO_2 units: UG/M^3

City	Saroad #	Instrument Method	*Number of Hourly obs.	Annual Arith. Mean	Max. 24 hr obs.	2nd Max 24 hr obs.	Max. 3 hr obs.	2nd Max 3 hr obs.	Max 1 hr obs.	2nd max 1 hr. obs.
BERKSHIRE AIR QUALITY CONTROL REGION (117)										
Pittsfield	1800-005	14	7139	21	102	92	246	215	288	257
CENTRAL MASSACHUSETTS AIR QUALITY CONTROL REGION (118)										
Fitchburg	0620-003	14**	7647	25	107	100	162	152	189	183
Worcester	2640-012	14**	8009	32	147	139	217	215	231	223
Worcester	2640-017	14	178*	66*	118	92	238	152	328	241
MERRIMACK VALLEY AIR QUALITY CONTROL REGION (121)										
Georgetown	0730-001	14	5592	18	58	52	162	149	189	181
Lawrence	1000-003	14**	7000	35	178	142	341	252	511	312
Lawrence	1000-004	14	684*	60*	178	136	341	252	312	312
Lowell	1080-004	14	7323	26	102	100	176	173	231	191
METROPOLITAN BOSTON AIR QUALITY CONTROL REGION (119)										
Boston	0240-002	14	7400	55	197	191	367	320	390	388
Boston	0240-016	14	3516*	21*	60	55	131	106	165	147
Boston	0240-021	14	3119*	34*	131	123	225	191	291	252
Medfield	1210-001	14	7555	18	71	71	139	115	189	186
Medford	1220-003	14	3273*	37*	149	118	254	238	307	293
Quincy	1880-002	14	6946	34	126	123	225	223	309	278
Somerville	2100-003	14	2394*	39*	157	118	233	202	354	257
Watertown	2380-005	20**	6562	33	149	141	278	249	307	288
PIONEER VALLEY AIR QUALITY CONTROL REGION (042)										
Chicopee	0400-005	14	7523	34	160	118	249	241	296	293
Springfield	2160-005	14	6916	31	155	131	406	272	485	293
Springfield	2160-014	20	337*	47*	86	76	100	100	144	123
SOUTHEASTERN MASSACHUSETTS AIR QUALITY CONTROL REGION (120)										
Attleboro	0120-003	14	8021	18	58	58	139	121	168	162
Fall River	0580-004	14	8111	31	380	272	679	631	697	673

*When total observations are less than 4000, sample size is insufficient to represent sound data results.

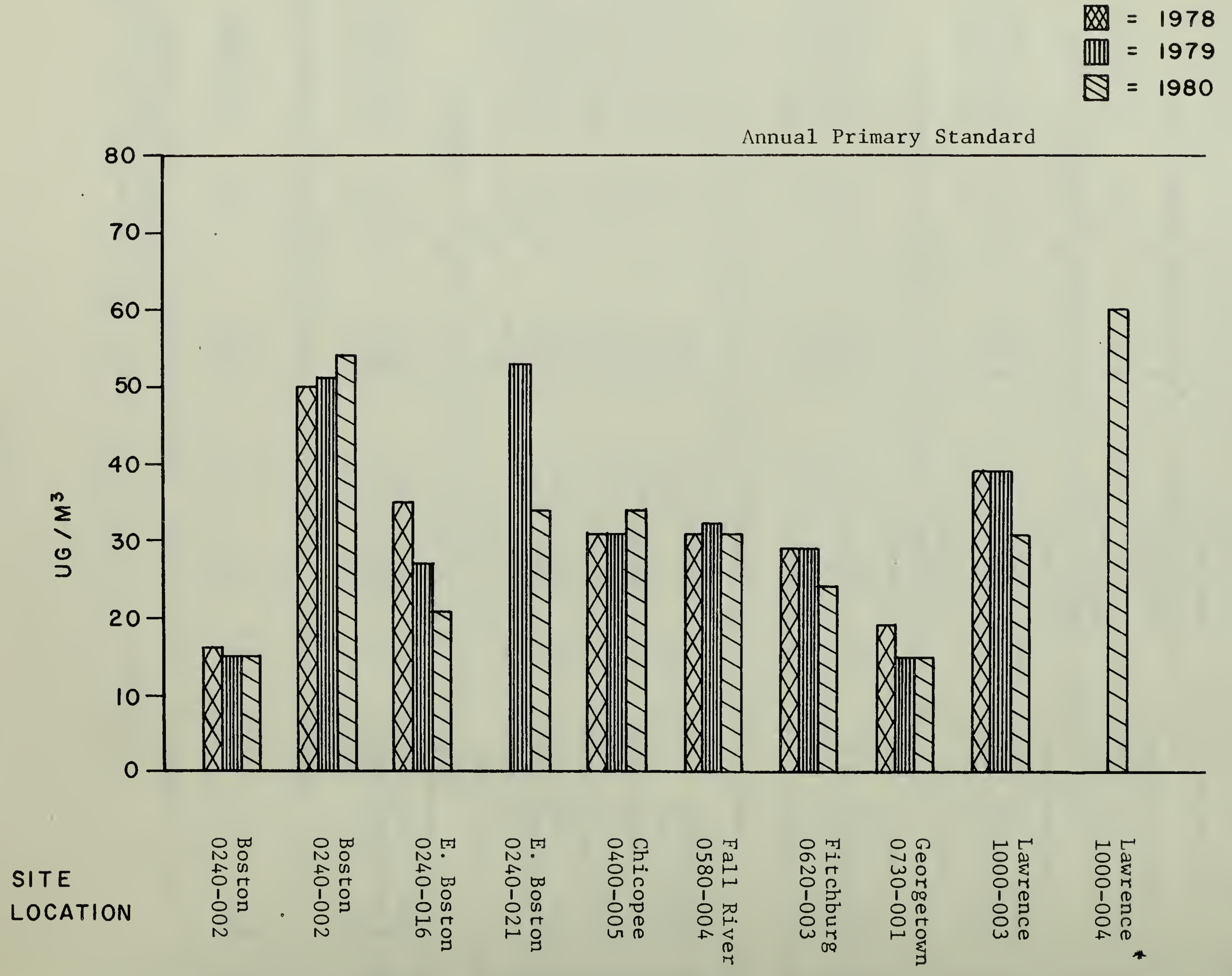
**Two analysis collection methods used at this site. (14)(20)

SULFUR DIOXIDE - SITE STATUS

	City	Saroad #	Operational Status 78	79	80
1.	Attleboro	0120-003	Y	Y	Y
2.	Boston	0240-002	Y	Y	Y
3.	E. Boston	0240-016	Y	Y	Y
4.	E. Boston	0240-021	Y	Y	Y
5.	Chicopee	0400-005	Y	Y	Y
6.	Fall River	0580-004	Y	Y	Y
7.	Fitchburg	0620-003	Y	Y	Y
8.	Georgetown	0730-001	Y	Y	Y
9.	Lawrence	1000-003	Y	Y	Y
10.	Lawrence	1000-004	N	N	Y
11.	Lowell	1080-004	Y	Y	Y
12.	Medfield	1210-001	Y	Y	Y
13.	Medford	1220-003	Y	Y	Y
14.	Pittsfield	1800-005	Y	Y	Y
15.	Quincy	1880-002	Y	Y	Y
16.	Somerville	2100-003	N	N	Y
17.	Springfield	2160-005	Y	Y	Y
18.	Springfield	2160-014	N	N	Y
19.	Watertown	2380-005	N	Y	Y
20.	Worcester	2640-012	Y	Y	Y
21.	Worcester	2640-017	N	N	Y

FIGURE 3

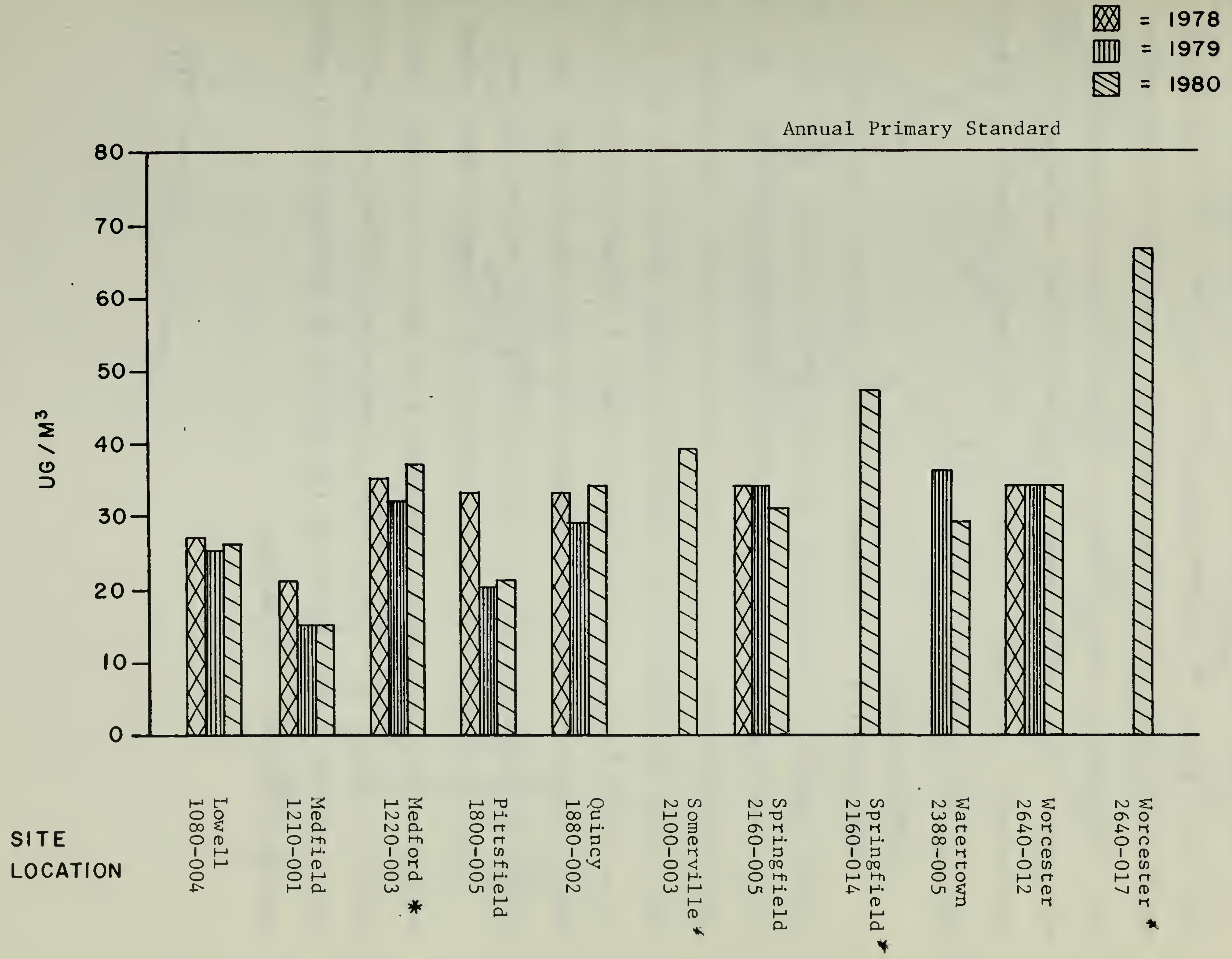
SUMMARY — 3 YEAR ARITHMETIC MEAN
FOR SULFUR DIOXIDE (UG / M³)



* when total observations are less than 4000, sample size is insufficient to represent sound data results

FIGURE 3 (Cont.)

SUMMARY — 3 YEAR ARITHMETIC MEAN
FOR SULFUR DIOXIDE (UG/M^3)



* when total observations are less than 4000, sample size is insufficient to represent sound data results

B. CARBON MONOXIDE

Sample Collection and Analysis

DAQC uses two manufacturers' models of Non-Dispersive Infrared (NDIR) analyzers for Carbon Monoxide detection. The respective manufacturers are Ethyl Interteck, Inc., and Horiba Instruments, Inc. Both instruments employ a short cell NDIR detection principle coupled with water vapor subtraction. This methodology meets equivalency requirements published by the U.S. Environmental Protection Agency in Part 58, 40 CFR, May 10, 1979.

Summary of Data

DAQC operated 13 stations for CO in 1980 and collected 51,039 hourly samples. The results of this effort indicate that no violation of the one hour NAAQS occurred while several violations of the eight hour NAAQS occurred in 4 of the APCD's statewide. The maximum eight hour value was recorded in Boston at the 600 Washington St. site. A value of 13.9 mg/m^3 was recorded. Table 6 summarizes the CO data for 1980. Figure 5 graphically displays the maximum one and eight hour values recorded at each of the sites relative to the standard.

The three-year/eight-hour comparative analysis (see Figure 6) indicates that in several instances 1979 levels of carbon monoxide seemed to shoot up to much higher levels then those recorded in both 1978 and 1980. This could be the result of meteorological conditions occurring during this period.

FIGURE 4

Continuous Monitoring Network
Carbon Monoxide

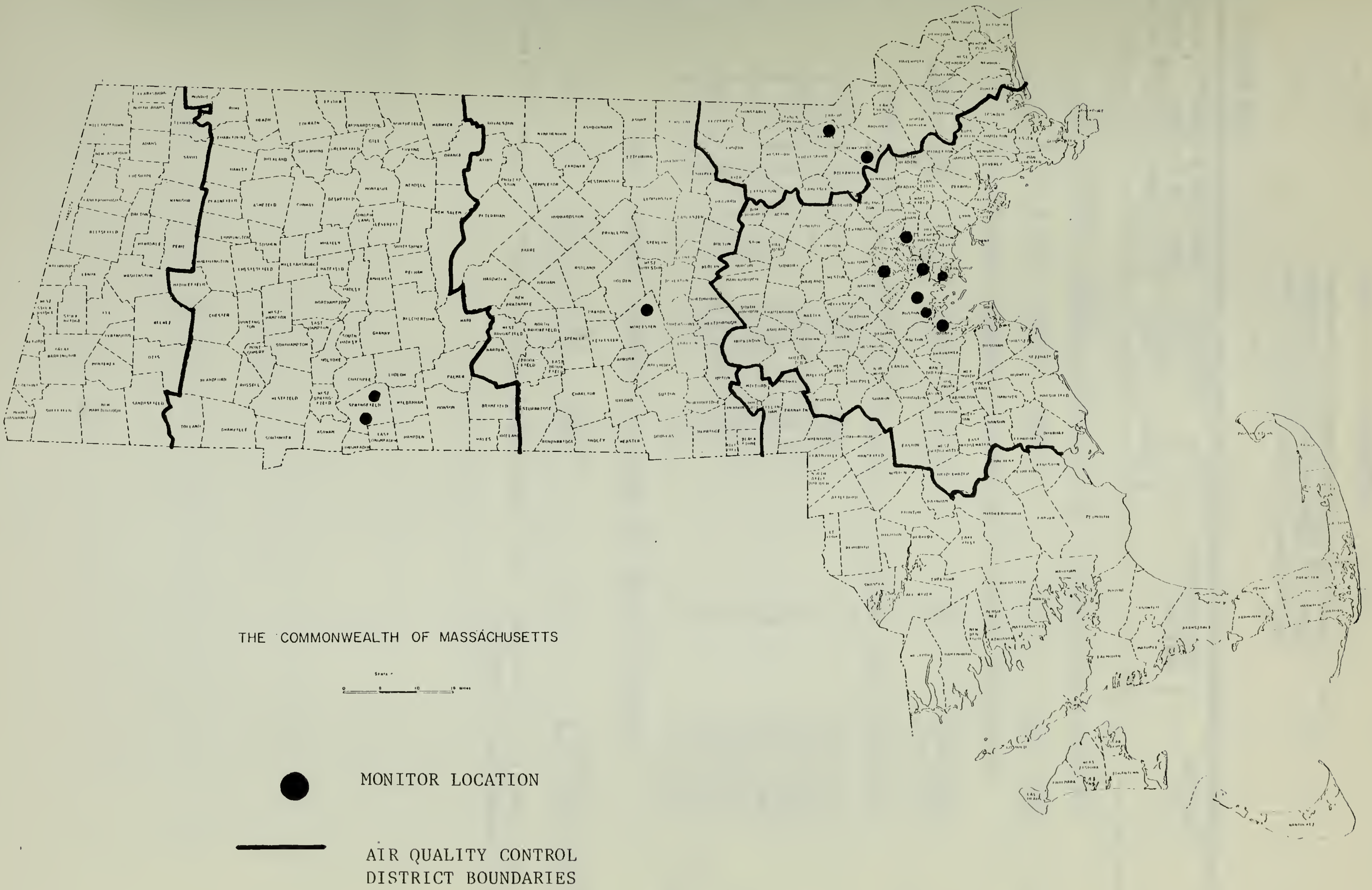

THE COMMONWEALTH OF MASSACHUSETTS
MONITOR LOCATION
AIR QUALITY CONTROL DISTRICT BOUNDARIES

TABLE 6

1980 CARBON MONOXIDE SUMMARY

CO Units: mg/m^3

City	Saroad #	Instrument Method	# * of obs.	Max. 1 hr. obs.	2nd Max 1 hr	Max 8 hr obs.	2nd Max 8 hr	# of 8 hr. averages above 10
CENTRAL MASSACHUSETTS AIR QUALITY CONTROL REGION (118)								
Worcester	2640-012	11	6780	29.9	23.0	12.4	9.5	1
MERRIMACK VALLEY AIR QUALITY CONTROL REGION (121)								
Lowell	1080-004	11	1011*	10.4	8.1	5.6	5.5	0
Tewksbury	2252-001	11	2131*	2.2	2.1	1.2	1.1	0
METROPOLITAN BOSTON AIR QUALITY CONTROL REGION (119)								
Boston	0240-002	11	5594	16.1	13.8	11.8	11.2	2
Boston	0240-016	11	2878*	18.4	16.1	11.9	11.9	10
Boston	0240-021	11	1834*	9.2	8.1	5.4	5.0	0
Boston	0240-022	11	2200*	28.8	21.9	13.9	11.4	2
Medford	1220-003	11	3497*	19.6	18.4	12.2	12.2	3
Quincy	1880-002	11	7730	11.5	11.5	8.1	5.3	0
Somerville	2210-003	11	114*	6.9	5.8	4.4	2.3	0
Watertown	2380-005	11	6167	10.4	10.4	8.2	6.8	0
PIONEER VALLEY AIR QUALITY CONTROL REGION (042)								
Springfield	2160-005	11	5171	16.1	15.0	8.1	7.5	0
Springfield	2160-014	11	336*	13.8	12.7	9.9	8.5	0

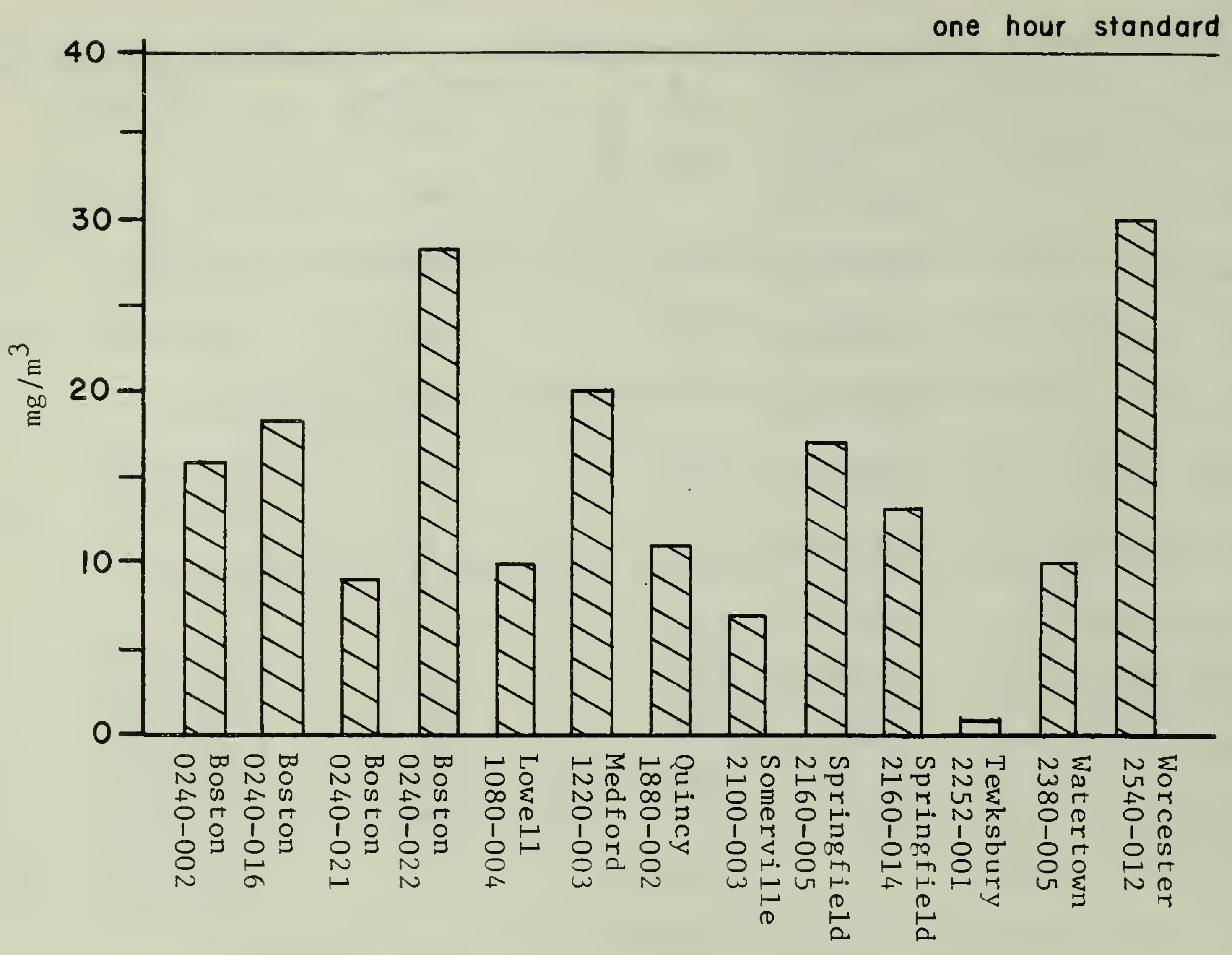
*When total observations are less than 4000, sample size is insufficient to represent sound data results.

CARBON MONOXIDE SITE STATUS

	City	Saroad #	Operational Status 78	79	80
1.	Boston	0240-002	Y	Y	Y
2.	Boston	0240-016	Y	Y	Y
3.	Boston	0240-021	N	N	Y
4.	Boston	0240-022	N	N	Y
5.	Lowell	1080-004	Y	Y	Y
6.	Medford	1220-003	Y	Y	Y
7.	Quincy	1880-002	Y	Y	Y
8.	Somerville	2100-003	N	N	Y
9.	Springfield	2160-005	Y	Y	Y
10.	Springfield	2160-014	N	N	Y
11.	Tewksbury	2252-001	N	N	Y
12.	Watertown	2380-005	N	Y	Y
13.	Worcester	2640-012	Y	Y	Y

FIGURE 5

1 HOUR MAX.



8 HOUR MAX.

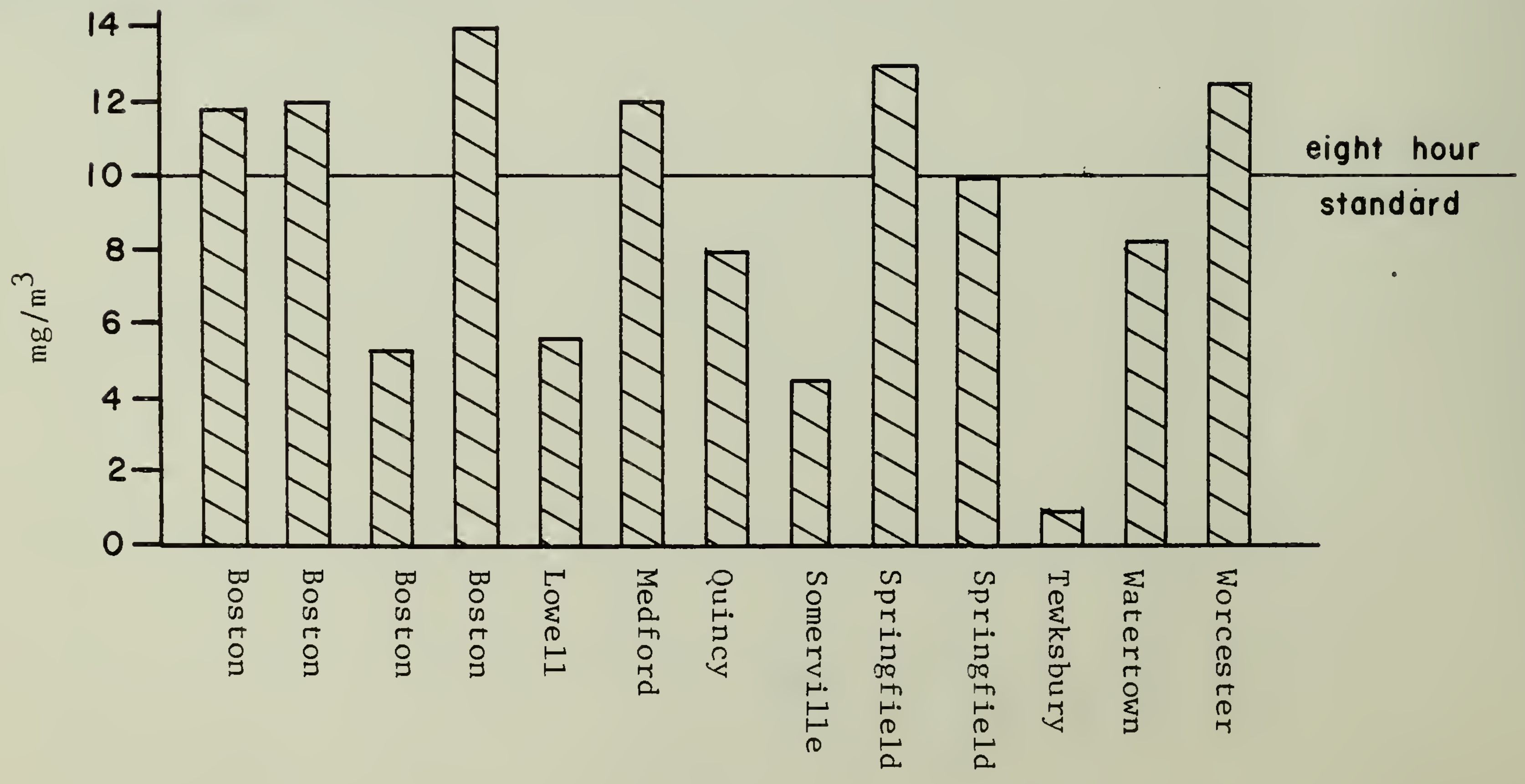
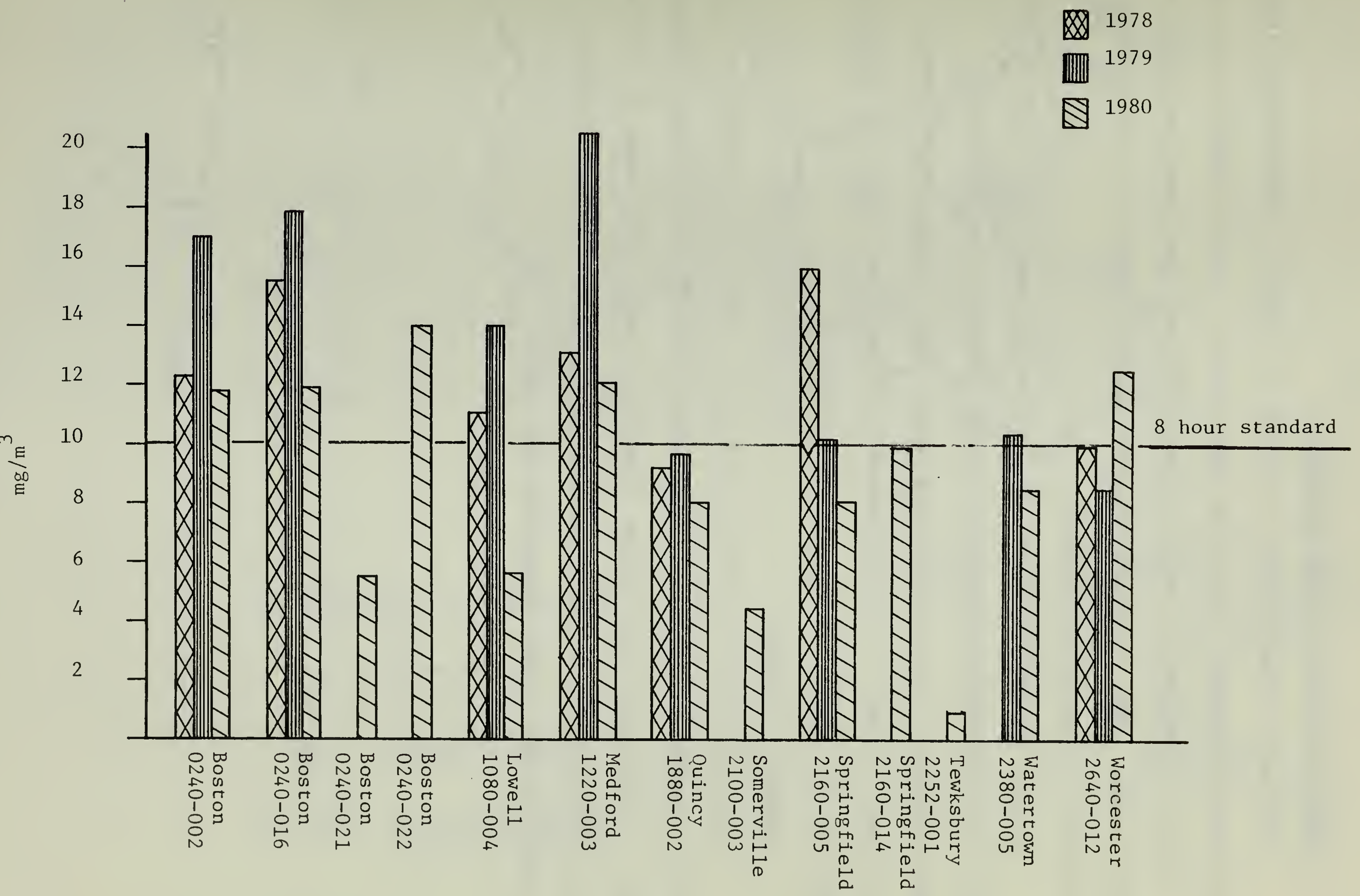


FIGURE 6

CARBON MONOXIDE

3 YEAR/8 HOUR SUMMARIES



C. OZONE

Sample Collection and Analysis

Continuous measurement of ozone is made by instruments utilizing the chemiluminescent detection principle. In this method, the ozone is reacted chemically with ethylene gas and the resultant compound emits light. The intensity of the emitted light is proportional to the amount of ozone contained.

Within the DAQC network the following manufacturers' models of chemiluminescent detectors are used: Monitor Labs-ML 8410A, Bendix-8101B. This methodology meets equivalency requirements published by the U.S. Environmental Protection Agency in Part 58, 40 CFR, May 10, 1979.

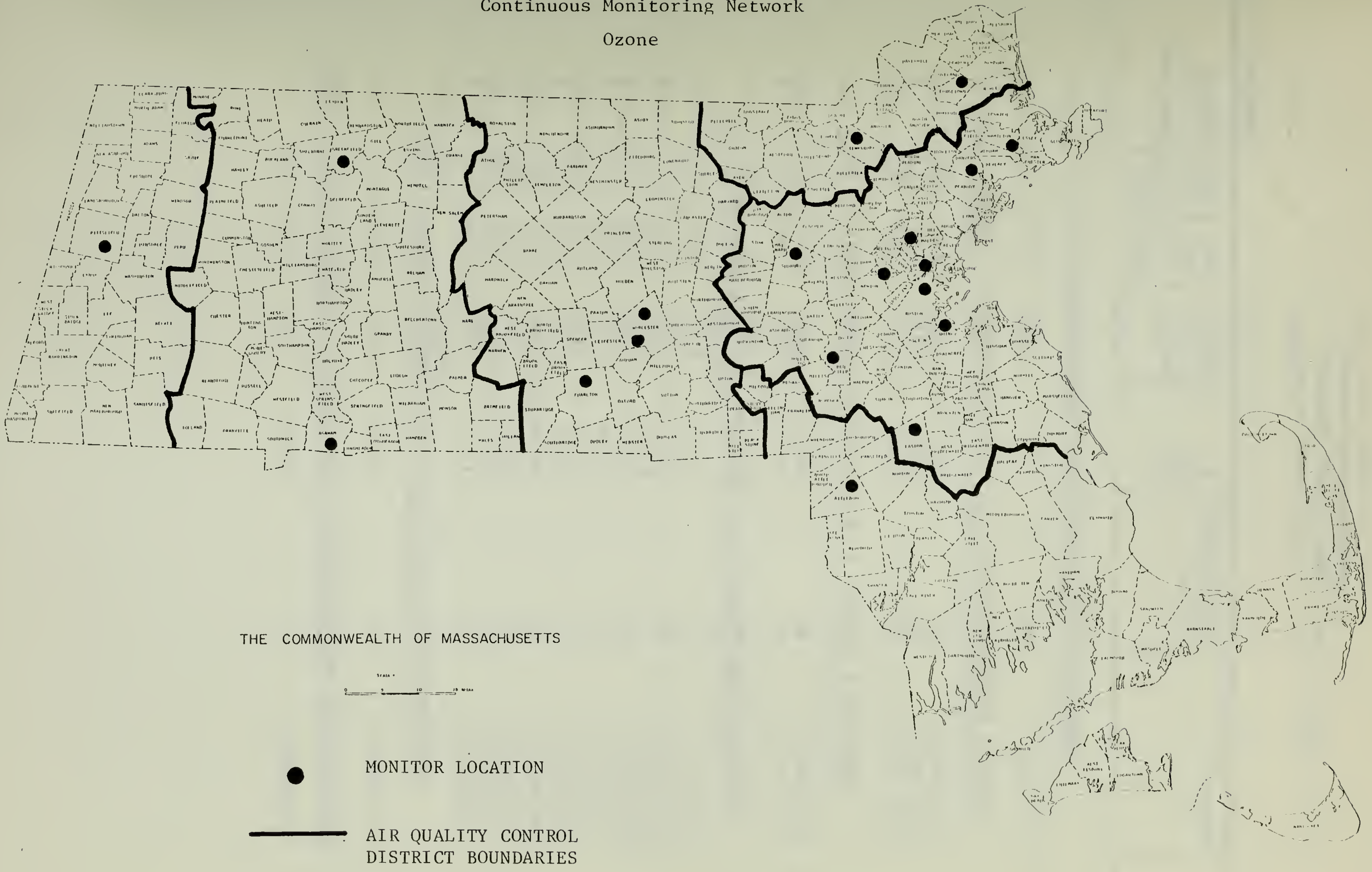
Summary of Data:

DAQC operated 19 stations for O_3 in 1980 and collected 57,991 hourly samples. Several of the sites within the network continue to show violations of the ozone standard. This continues to demonstrate the pervasiveness of this air quality problem in Massachusetts. Table 7 contains the ozone summaries for 1980.

FIGURE 7

Continuous Monitoring Network

Ozone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MONITOR LOCATION
AIR QUALITY CONTROL DISTRICT BOUNDARIES

TABLE 7

1980 OZONE SUMMARY

O_3 units = (ppm)

City	Saroad #	Instrument Method	# of obs.	Max. 1 hr obs.	2nd Max 1 hr obs.	3rd Max 1 hr obs.	Values > .125 measured
BERKSHIRE AIR POLLUTION CONTROL REGION (117)							
Pittsfield	1800-005	11	4879	.130	.107	.105	1
CENTRAL MASSACHUSETTS AIR QUALITY CONTROL REGION (118)							
Charlton	0372-001	11	3546	.117	.112	.108	0
Worcester	2460-012	11	4025	.138	.126	.124	3
Worcester	2640-015	11	1920	.193	.178	.177	10
MERRIMACK VALLEY AIR QUALITY CONTROL REGION (121)							
Georgetown	0730-001	11	8252	.160	.151	.144	12
Tewksbury	2252-001	11	1957	.165	.140	.116	6
METROPOLITAN BOSTON AIR QUALITY CONTROL REGION (119)							
Boston	0240-016	11	682	.070	.068	.050	0
Boston	0240-021	11	4565	.120	.110	.103	0
Danvers	0480-002	11	1703	.138	.135	.135	7
Easton	0535-001	11	2062	.150	.145	.133	5
Hamilton	0795-001	11	1536	.134	.120	.112	1
Medfield	1210-001	11	4803	.159	.154	.148	13
Medford	1220-003	11	1385	.079	.073	.068	0
Quincy	1880-002	11	1658	.129	.121	.114	1
Somerville	2100-003	11	3074	.140	.132	.130	5
Sudbury	2196-001	11	2957	.150	.140	.140	10
Watertown	2380-005	11	3315	.145	.134	.134	9
PIONEER VALLEY AIR POLLUTION CONTROL REGION (042)							
Agawam	0030-002	11	3747	.185	.155	.153	16
SOUTHEASTERN MASSACHUSETTS AIR QUALITY CONTROL REGION (120)							
Attleboro	0120-003	11	4783	.136	.127	.121	3

1980 OZONE SITE STATUS

	City	Saroad #	Operational Status 78	79	80
1.	Agawam	0030-002	N	Y	Y
2.	Attleboro	0120-003	Y	Y	Y
3.	E. Boston	0240-021	N	N	Y
4.	Charlton	0372-001	N	Y	Y
5.	Danvers	0480-002	N	N	Y
6.	N. Easton	0535-001	N	N	Y
7.	Georgetown	0730-002	Y	Y	Y
8.	Greenfield	0780-002	N	Y	N
9.	Hamilton	0795-001	N	N	Y
10.	Medfield	1210-001	Y	Y	Y
11.	Medford	1220-003	Y	Y	Y
12.	Pittsfield	1800-005	N	Y	Y
13.	Quincy	1880-002	Y	Y	Y
14.	Somerville	2100-003	N	N	Y
15.	Sudbury	2196-001	N	N	Y
16.	Tewksbury	2252-001	N	N	Y
17.	Watertown	2380-005	N	N	Y
18.	Worcester	2640-012	Y	Y	Y
19.	Worcester	2640-015	N	Y	Y

D. NITROGEN DIOXIDE

Sample Collection and Analysis

Continuous measurement of Nitrogen Dioxide (NO_2) is made using the chemiluminescent detection principle. In this method, nitric oxide (NO) and oxides of nitrogen (NO_x) are reacted with ozone and the resultant chemical products emit light i.e., luminesces. As in the case with ozone analyzers, this amount of light emitted is proportional to the amount of NO and NO_x, the result being NO_2.

Two manufacturers' models of chemiluminescent NO-NO_x analyzers are used in the DAQC network. These are: Thermo Electron Corp. - Model 14D and Monitor Lab., Inc. - Model 8440. This methodology meets equivalency requirements published by the U.S. Environmental Protection Agency in Part 58, 40 CFR, May 10, 1979.

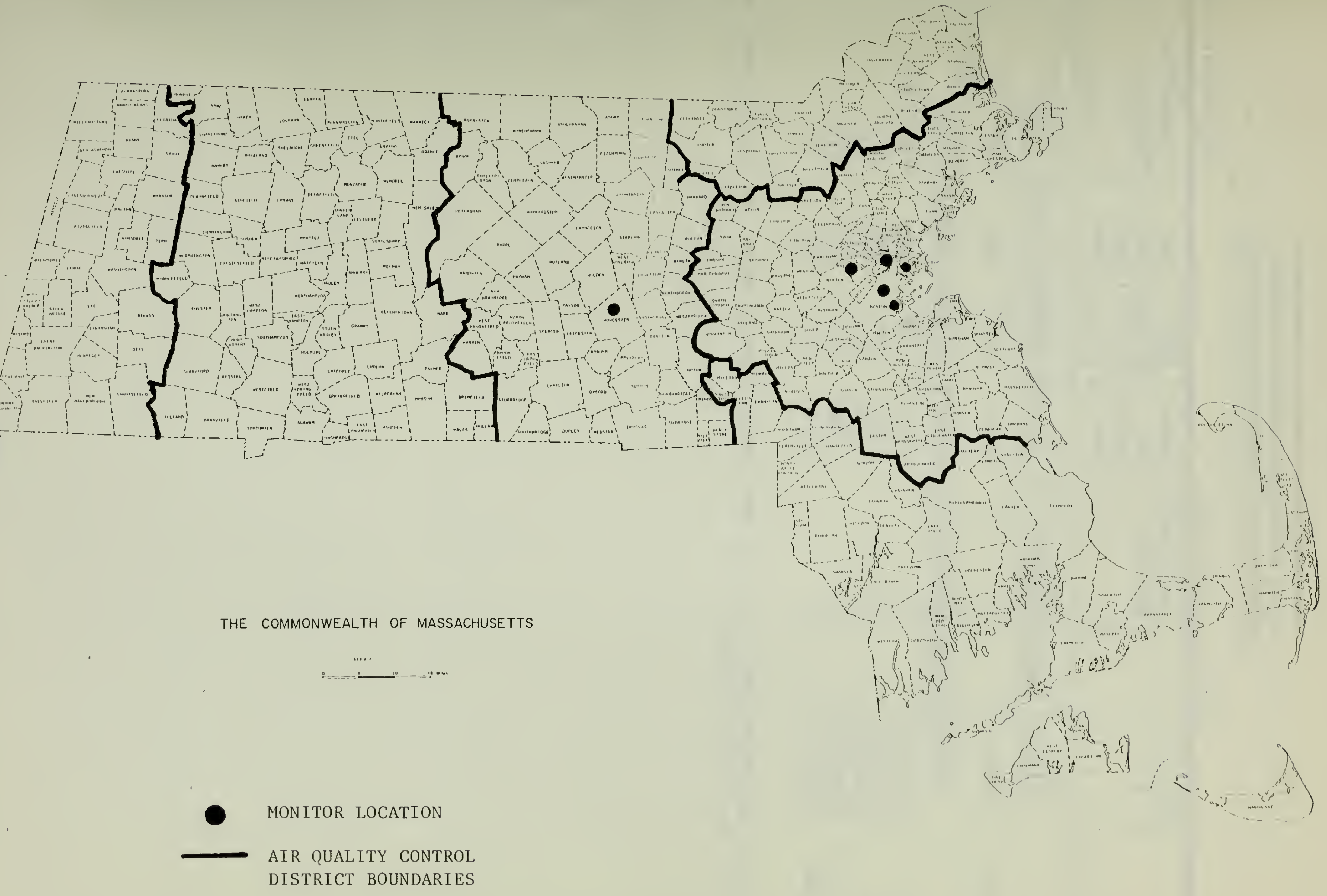
Summary of Data

DAQC operated 6 stations for NO_2 in 1980 and collected 16,824 hourly samples. All stations monitored are currently in compliance with the standard. The limited amount of data collected in 1980 and in the past, precludes the usefulness of making any further conclusions relative to this data set.

Table 8 contains the nitrogen dioxide summary for 1980.

FIGURE 8
Continuous Monitoring Network

Nitrogen Dioxide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● MONITOR LOCATION
AIR QUALITY CONTROL DISTRICT BOUNDARIES

TABLE 8

1980 NITROGEN DIOXIDE SUMMARY

NO_2 units: (ug/m^3)

City	Saroad #	Instrument Method	Number of Hourly obs.	Max 1 hr obs.	2nd Max 1 hour obs.	Arithmetic Mean
CENTRAL MASSACHUSETTS AIR QUALITY CONTROL REGION (118)						
Worcester	2640-012	14	4825	201	160	40
METROPOLITAN BOSTON AIR QUALITY CONTROL REGION (119)						
Boston	0240-002	14	5186	338	338	93
Boston	0240-016	14	2333*	395	385	101*
Boston	0240-021	14	694*	197	188	61*
Somerville	2100-003	14	346*	132	132	45*
Watertown	2380-005	14	2182*	417	182	37*

*When total observations are less than 4000, sample size is insufficient to represent sound data results.

1980 NITROGEN DIOXIDE SITE STATUS

	City	Saroad #	Operational Status 78	79	80
1.	Boston	0240-002	Y	Y	Y
2.	Boston	0240-016	Y	Y	Y
3.	Boston	0240-021	N	N	Y
4.	Somerville	2100-003	N	N	Y
5.	Watertown	2380-005	N	N	Y
6.	Worcester	2640-012	N	N	Y

E. TOTAL SUSPENDED PARTICULATES

Sample Collection and Analysis

TSP measurements are routinely made using the standard high volume air sampler method every sixth day. In this procedure air is drawn through an 8"x10" fiberglass pre-weighed filter at the rate of 60 CFM for a period of 24 hours beginning at midnight. At the conclusion of the sampling, the filter is removed and transported to a laboratory for reweighing. The difference in weights in milligrams is divided by the volume of air passed through thus giving a weight per unit volume result i.e., ug/m^3. Upon completion of the TSP (weight/unit volume) calculation, several other physical and chemical tests can be performed upon the collected sample. This methodology meets equivalency requirements published by the U.S. Environmental Protection Agency in Part 58, 40 CFR, May 10, 1979.

Summary of Data

DAQC operated 43 stations for TSP in 1980 and collected 3,025 samples. The results from this effort indicate that an exceedance of the 24 hour NAAQS (260 ug/m^3) occurred in Worcester, Mass. at the corner of New Salem St. & Washington Street station, on February 12, 1980. All other areas monitored as indicated by the data set, are in compliance with this standard. It should be noted that, even though no violations of the hourly primary standard at these sites occurred in 1980, the trends as indicated in Figure 10 show TSP levels rising. In 1980, 28 of the 43 sites monitored showed an increase in TSP values over the 1979 values.

Five of the 43 sites monitored were new additions to the network in 1980, while 8 of the sites showed decreases over the 1979 values and 2 sites remained the same. Violations of the secondary 24 hour standard of 150 ug/m^3 occurred at the Howard St., Springfield and at the New Salem and Washington Sts. monitors in Worcester, MA.

Table 9 contains the TSP summary for 1980.

FIGURE 9

Continuous Monitoring Network

Total Suspended Particulates

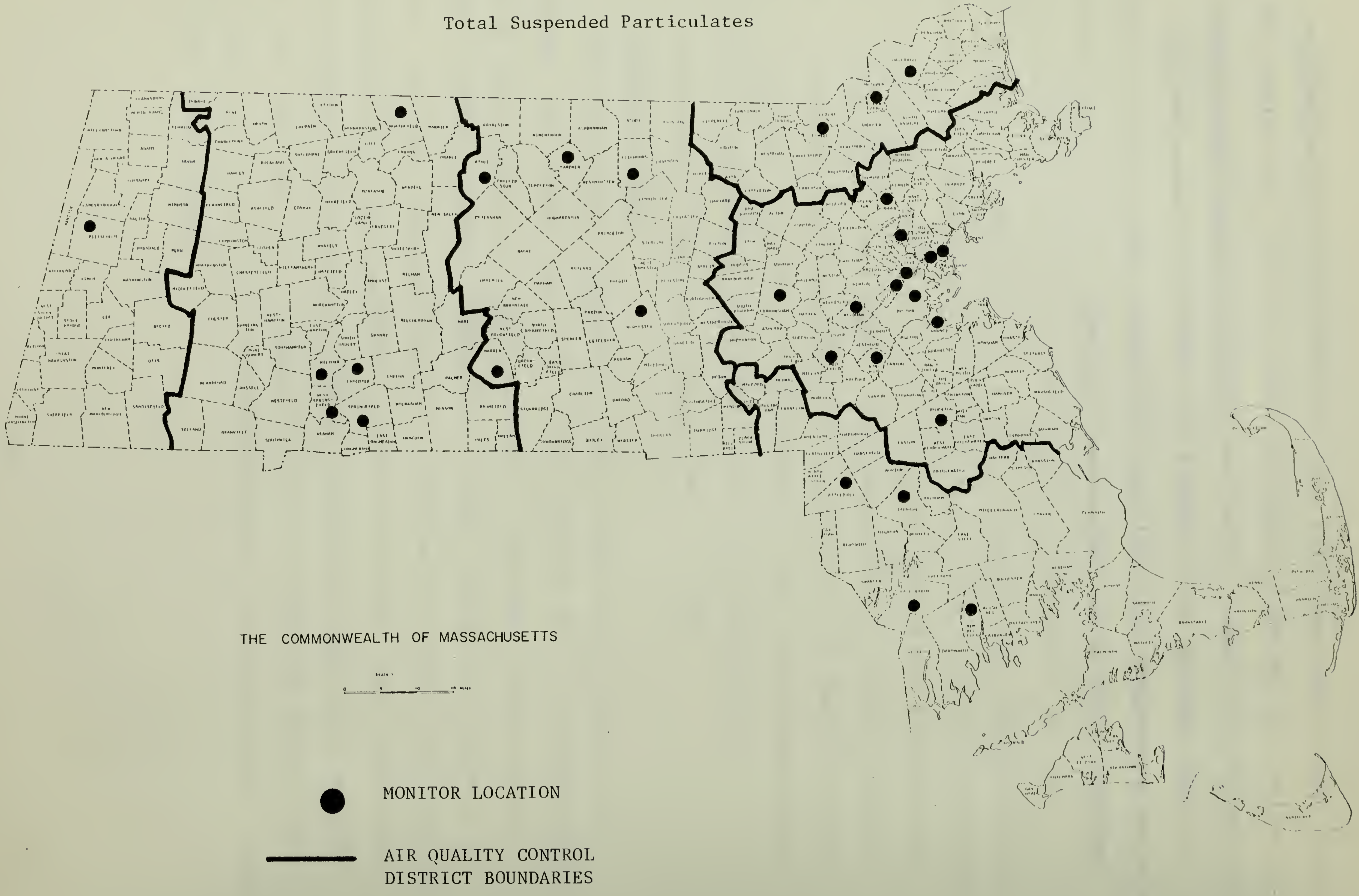

THE COMMONWEALTH OF MASSACHUSETTS
Scale
0
5
10
15 Miles
MONITOR LOCATION
AIR QUALITY CONTROL DISTRICT BOUNDARIES

TABLE 9

1980 TOTAL SUSPENDED PARTICULATES SUMMARY

TSP units: (ug/m^3)

ty	Saroad #	Number of Obs.	Minimum Obs.	1st Max Obs.	2nd Max Obs.	3rd Max Obs	Arith. Mean	Geo. Mean
BERKSHIRE AIR QUALITY CONTROL REGION (117)								
ttsfield	1800-002	57	14	121	87	85	56	52
ttsfield	1800-006	50	16	192	137	134	64	58
CENTRAL MASSACHUSETTS AIR QUALITY CONTROL REGION (118)								
hol	0100-001	56	20	158	109	107	61	56
tchburg	0620-004	48	14	158	142	129	66	60
tchburg	0620-006	61	9	138	114	114	66	59
rdner	0720-003	27*	27	88	82	72	--	--
rren	2372-001	60	12	112	85	65	39	35
rcester	2640-004	252	18	131	120	116	52	49
rcester	2640-008	57	24	127	82	76	49	46
rcester	2640-009	59	16	129	85	81	50	46
rcester	2640-011	60	16	113	95	83	45	41
rcester	2640-012	77	27	266	187*	164**	85	78
rcester	2640-013	60	19	129	99	96	55	50
rcester	2640-016	72	31	139	136	128	64	60
MERRIMACK VALLEY AIR QUALITY CONTROL REGION (121)								
verhill	0840-001	53	17	118	96	96	52	47
wrence	1000-003	49*	24	130	110	110	--	--
well	1080-005	9*	29	82	81	76	--	--
METROPOLITAN BOSTON AIR QUALITY CONTROL REGION (119)								
ston	0240-012	50	19	149	133	125	80	74
ston	0240-025	15*	26	96	64	55	--	--
rockton	0320-003	59	22	89	81	78	48	46
rookline	0340-001	56	17	85	79	78	49	46
ambridge	0360-001	57	19	86	85	85	53	49
helsea	0380-002	56	6	124	120	118	66	61
ramingham	0660-001	54	17	107	90	85	49	46
edfield	1210-001	57	15	85	61	58	36	34
edford	1220-002	59	18	124	104	94	61	58
eedham	1480-003	60	14	95	82	80	40	44
orwood	1700-001	60	13	90	89	82	53	58
uincy	1880-007	59	24	155	141	96	50	54
evere	1940-002	53	17	166	127	122	58	52
oburn	2620-002	59	14	135	103	95	56	52

TABLE 9 (cont.)

1980 TOTAL SUSPENDED PARTICULATES SUMMARY

TSP units: (ug/m^3)

City	Saroad #	Number of Obs.	Minimum Obs.	1st Max Obs.	2nd Max Obs.	3rd Max Obs	Arith. Mean	Geo. Mean
PIONEER VALLEY AIR QUALITY CONTROL REGION (042)								
Chicopee	0400-001	53	21	141	106	105	69	65
Holyoke	0860-006	43	38	131	116	115	64	61
Holyoke	0860-007	15*	28	122	93	80	--	--
Northfield	1652-001	47	25	95	87	79	45	42
W Springfield	2475-003	13*	17	143	72	65	--	--
Springfield	2160-002	21*	52	155	92	82	--	--
Springfield	2160-003	19*	43	127	115	88	--	--
Springfield	2160-011	291	23	237	185**	176**	63	58
SOUTHEASTERN MASSACHUSETTS AIR QUALITY CONTROL REGION (120)								
Attleboro	0120-002	58	24	91	91	90	53	51
Fall River	0580-001	57	22	145	110	109	69	65
New Bedford	1500-002	58	4	89	87	78	47	43
Taunton	2240-001	56	21	93	91	90	53	50

*When total observations are less than 40, sample size is insufficient to represent sound data.

**Represents violations of the NAAQS secondary 24 hour standard (150 ug/m^3).

1980 TOTAL SUSPENDED PARTICULATES SITE STATUS

	City	Saroad #	Operational Status 78	79	80
1.	Athol	0100-001	Y	Y	Y
2.	Attleboro	0120-002	Y	Y	Y
3.	Boston	0240-012	Y	Y	Y
4.	Boston	0240-025	N	N	Y
5.	Brockton	0320-003	Y	Y	Y
6.	Brookline	0340-001	Y	Y	Y
7.	Cambridge	0360-001	Y	Y	Y
8.	Chelsea	0380-002	Y	Y	Y
9.	Chicopee	0400-001	Y	Y	Y
10.	Fall River	0580-001	Y	Y	Y
11.	Fitchburg	0620-004	Y	Y	Y
12.	Fitchburg	0620-006	Y	Y	Y
13.	Framingham	0660-001	Y	Y	Y
14.	Gardner	0720-003	N	N	Y
15.	Haverhill	0840-001	Y	Y	Y
16.	Holyoke	0860-006	Y	Y	Y
17.	Holyoke	0860-007	N	N	Y
18.	Lawrence	1000-003	Y	Y	Y
19.	Lowell	1080-005	Y	Y	Y
20.	Medfield	1210-001	Y	Y	Y
21.	Medford	1220-022	Y	Y	Y
22.	Needham	1480-003	Y	Y	Y
23.	New Bedford	1500-002	Y	Y	Y
24.	Northfield	1652-001	Y	Y	Y
25.	Norwood	1700-001	Y	Y	Y
26.	Pittsfield	1800-002	Y	Y	Y
27.	Pittsfield	1800-006	N	Y	Y
28.	Quincy	1880-007	Y	Y	Y
29.	Revere	1940-002	Y	Y	Y
30.	Springfield	2160-002	Y	Y	Y
31.	Springfield	2160-003	Y	Y	Y
32.	Springfield	2160-011	Y	Y	Y
33.	Taunton	2240-001	Y	Y	Y
34.	Warren	2372-001	Y	Y	Y
35.	W. Springfield	2475-003	N	N	Y
36.	Woburn	2620-002	Y	Y	Y
37.	Worcester	2640-004	Y	Y	Y
38.	Worcester	2640-008	Y	Y	Y
39.	Worcester	2640-009	Y	Y	Y
40.	Worcester	2640-011	Y	Y	Y
41.	Worcester	2640-012	Y	Y	Y
42.	Worcester	2640-013	Y	Y	Y
43.	Worcester	2640-016	N	N	Y

FIGURE 10

SUMMARY — 3 YEAR ARITHMETIC MEAN
FOR TOTAL SUSPENDED PARTICULATES
(UG / M³)

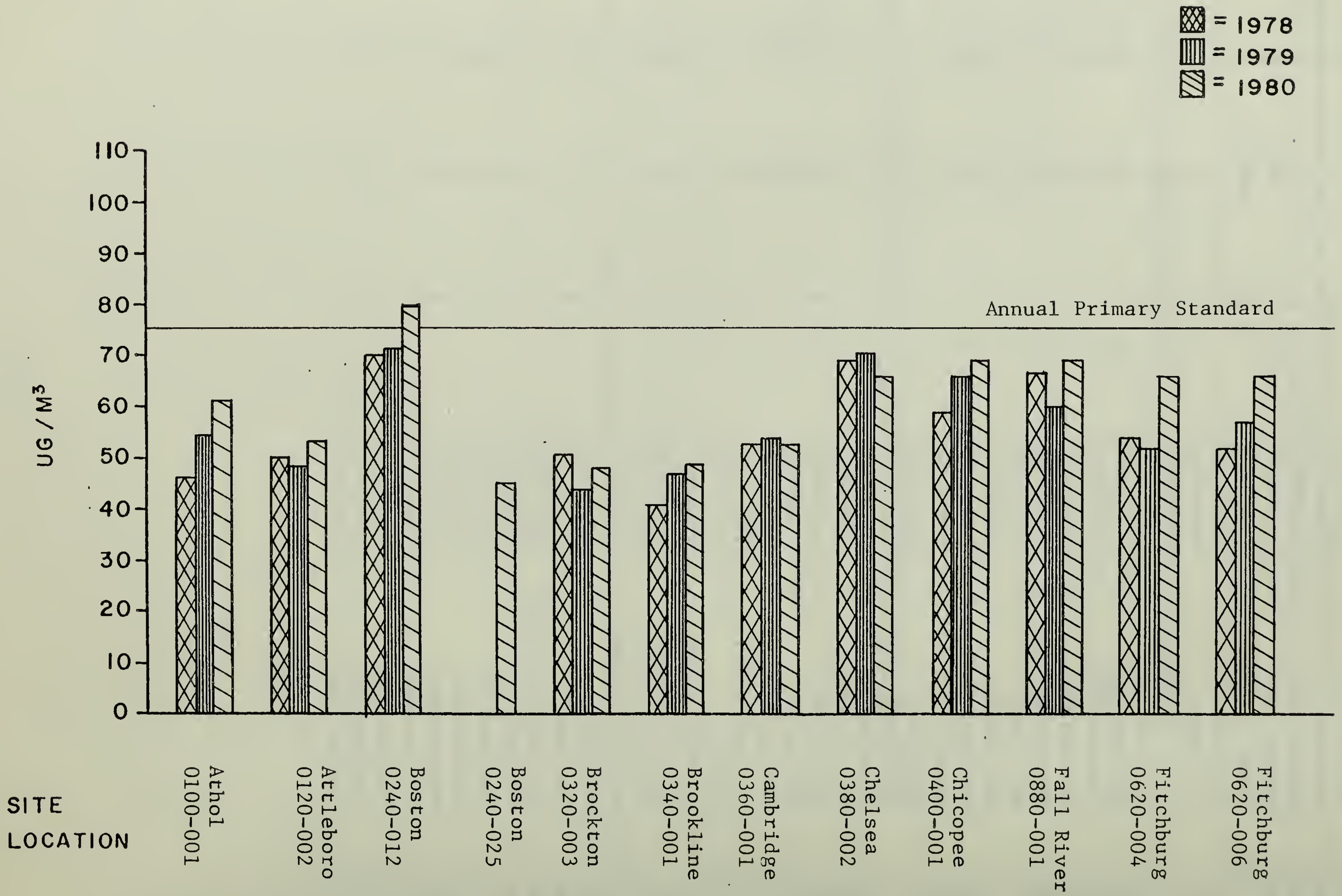


FIGURE 10 (Cont.)

SUMMARY — 3 YEAR ARITHMETIC MEAN
FOR TOTAL SUSPENDED PARTICULATES
(UG / M³)

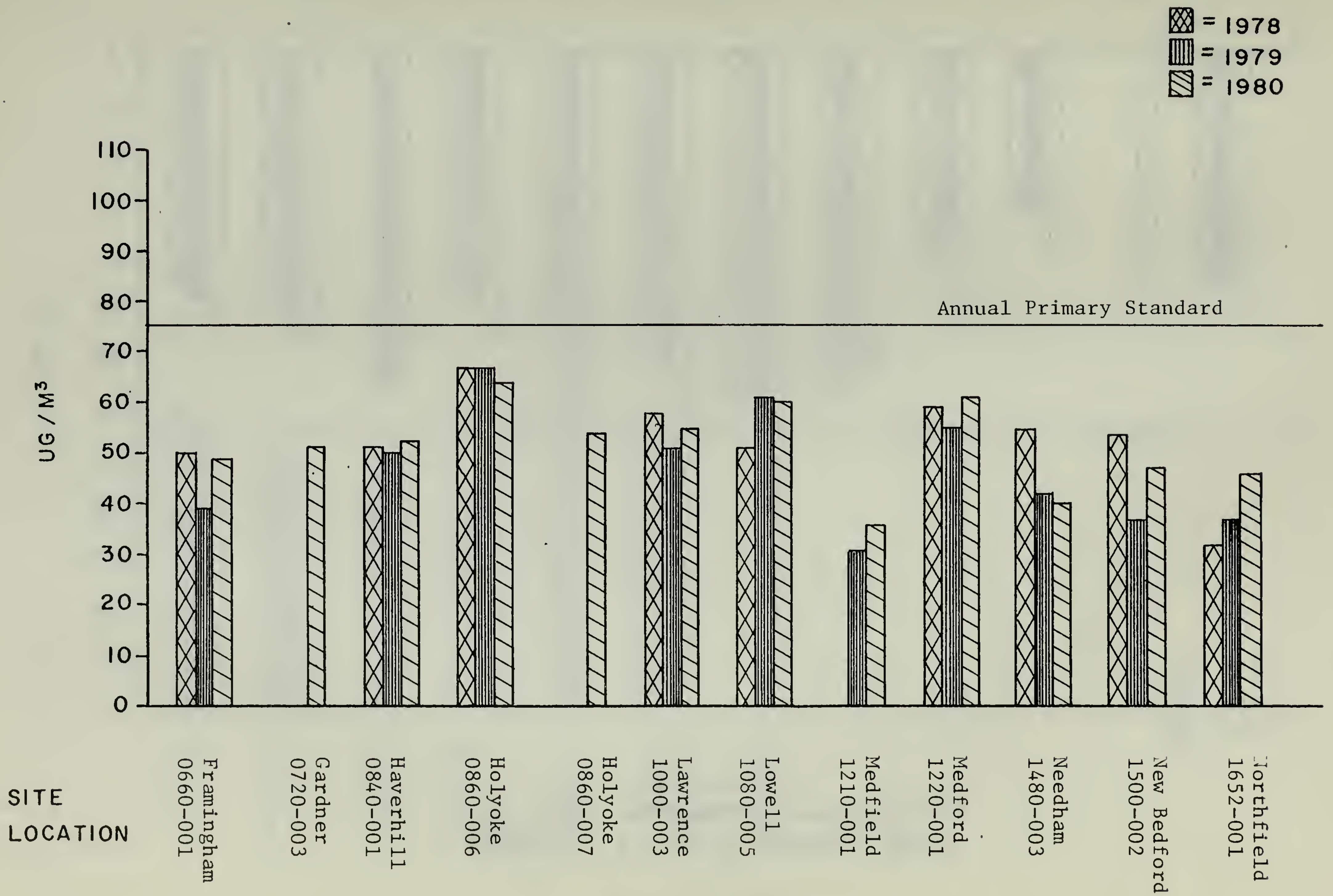


FIGURE 10 (Cont.)

SUMMARY — 3 YEAR ARITHMETIC MEAN
FOR TOTAL SUSPENDED PARTICULATES
(UG / M³)

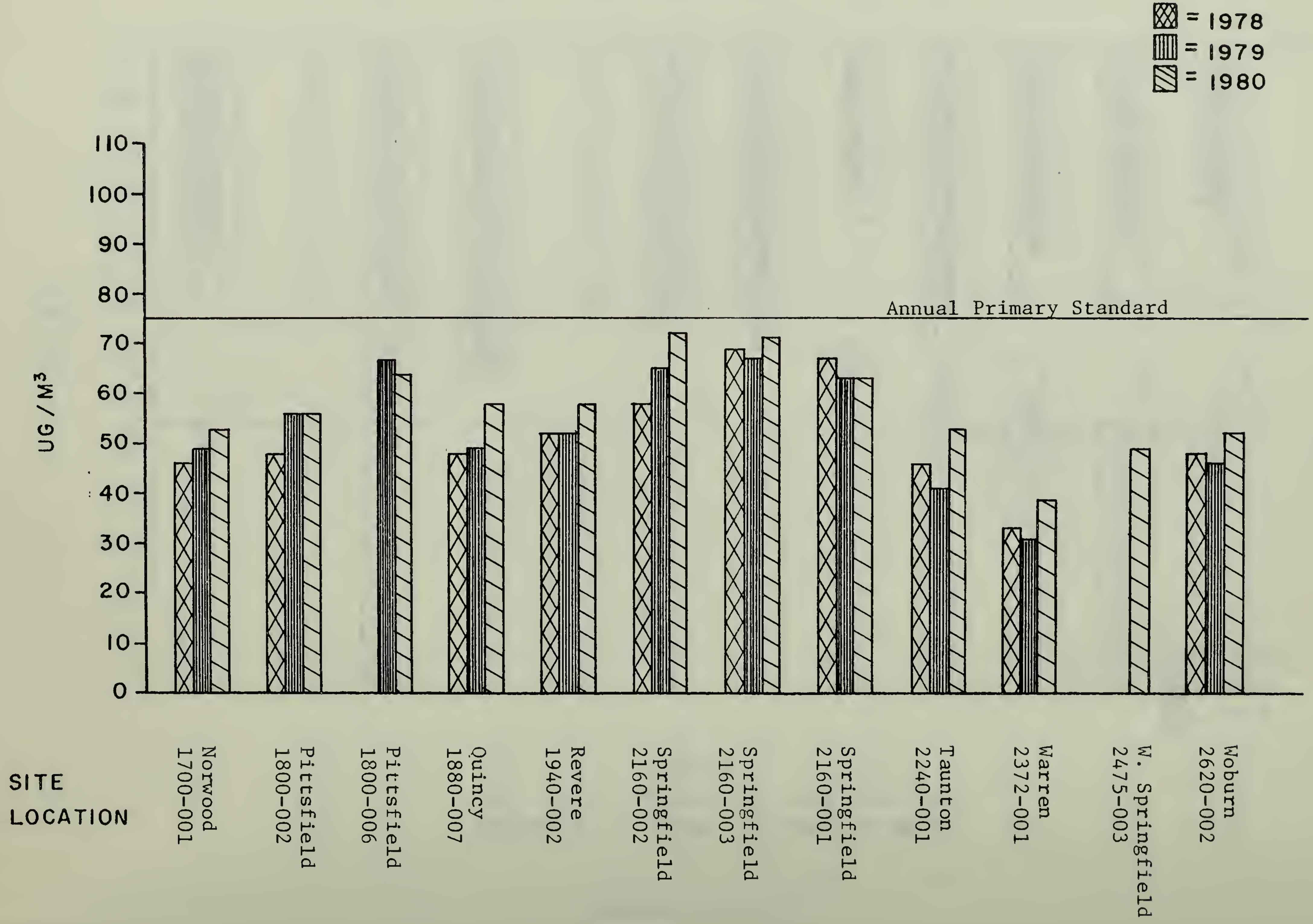
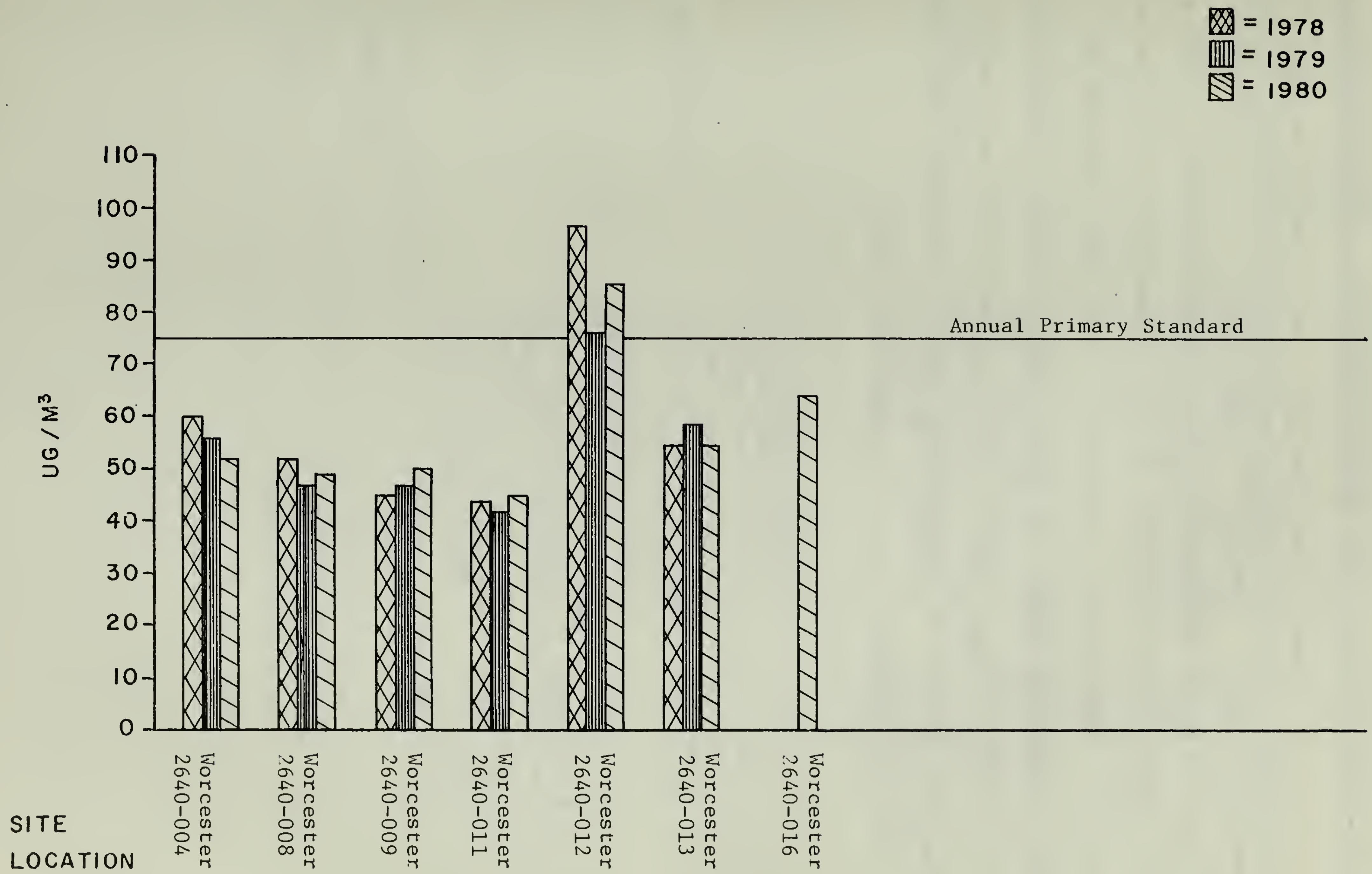


FIGURE 10 (Cont.)

SUMMARY — 3 YEAR ARITHMETIC MEAN
FOR TOTAL SUSPENDED PARTICULATES
(UG/M^3)



F. POLLUTANT STANDARD INDEX (PSI)

PSI provides a simple, uniform way to report daily air pollution concentrations, to tell the public about the general health effects associated with these concentrations, and to describe some general precautionary steps that can be taken. PSI is a reporting tool that converts the ozone pollutant concentrations measured in the air to a simple number on a scale of 0 to 500. (See Table 10 for specific breakdown.) DEQE reports ozone PSI values daily during the months of May through September for three areas; Eastern, Central and Western Massachusetts. These reports are broadcast daily as a public information service in cooperation with the American Lung Association.

Table 11 contains the PSI summary for 1980.

TABLE 10

POLLUTANT STANDARD INDEX (PSI)

PSI values, descriptor words, generalized health effects, and cautionary statements.

Index Value	PSI Descriptor	General Health Effects	Cautionary Statements
500			
		Premature death of ill and elderly. Healthy people will experience adverse symptoms that affect their normal activity.	All persons should remain indoors, keeping windows and doors closed. All persons should minimize physical exertion and avoid traffic.
400			
	hazardous	Premature onset of certain diseases in addition to significant aggravation of symptoms and decreased exercise tolerance in healthy persons.	Elderly and persons with existing diseases should stay indoors and avoid physical exertion. General population should avoid outdoor activity.
300			
	very unhealthful	Significant aggravation of symptoms and decreased exercised tolerance in persons with heart or lung disease with widespread symptoms in the healthy population.	Elderly and persons with existing heart or lung disease should stay indoors and avoid physical activity.
200			
	unhealthful	Mild aggravation of symptoms in susceptible persons, with irritation symptoms in the healthy population.	Persons with existing heart or respiratory ailments should reduce physical exertion and outdoor activity.
100			
	moderate		
50			
	good		
0			

TABLE 11

1980 POLLUTANT STANDARD INDEX

		Eastern	Central	Western
APRIL	Good	18	24	26
	Moderate	13	7	5
	Unhealthful	0	0	0
MAY	Good	14	21	19
	Moderate	14	9	11
	Unhealthful	2	0	0
JUNE	Good	5	15	11
	Moderate	21	14	17
	Unhealthful	5	2	3
JULY	Good	11	19	16
	Moderate	18	12	15
	Unhealthful	2	0	0
AUGUST	Good	7	25	14
	Moderate	13	5	15
	Unhealthful	0	0	1
SEPTEMBER	Good	55	104	86
	Moderate	79	47	63
	Unhealthful	9	2	4

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